DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name: Reynolds Metals Co.
Facility Address: Massena, NY 13662
Facility EPA ID #: NYD002245967

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination? **(Note: This determination addresses contaminated media regulated under New York State's Inactive Hazardous Waste Disposal Site Remedial Program.)**

   __X__ If yes - check here and continue with #2 below.

   ____ If no - re-evaluate existing data, or

   ____ if data are not available, skip to #8 and check the"IN" status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Is **groundwater** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

__X__ If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.

____ If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."

____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

Background

The Reynolds Metals Company (RMC) owns and operates an aluminum reduction plant in the Town of Massena, St. Lawrence County, New York. The plant is located off Route 37 near the Massena-Cornwall International Bridge (Fig. 1). The Plant was constructed in 1958 for the production of aluminum from alumina (aluminum oxide). The facility occupies about 7 percent or 112 acres of the total plant property owned by Reynolds. The main components of the plant include the reduction plant and any pertinent structures and facilities encompassing about 20.5 acres, the industrial waste landfill, (11.5 acres) and the Black Mud Lagoon (6 acres).

As a result of production activities and years of continuous operation and expansion, various types of industrial waste, including hazardous waste, were generated, disposed and spread throughout the facility. In September 1987, RMC entered into a Remedial Investigation/Feasibility Study (RI/FS) Consent Order with the Department (index no. A6-0119-87-08) to develop and implement a facility wide remedial program.

Previous Investigations

Numerous site wide investigations of the RMC facility have been performed prior to and in conjunction with the RI/FS consent order. The following is a list of reports on file that detail the findings of those investigations:

[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

Report Title	Date
Preliminary Investigation of the RMC Black Mud Lagoon, Phase I Summary Report	12/83
Preliminary Investigation of RMC Landfill, Phase I Summary Report	9/84
Subsurface Exploration and Permeability Test Report, Industrial Landfill	3/85
Preliminary Report, Evaluation of Pond Leakage, RMC	7/85
Hydrogeologic Assessment for the Proposed Black Mud Pond	11/85
Preliminary Risk Assessment, RMC	2/25/88
PCB Source Identification at RMC	7/29/88
Annual Report - 1988 Environmental Activities	9/23/88
Interim Remediation Report	1/19/89
Report on PCB Source Identification Assessment	2/20/89
Landfill Underdrain, and BMP Terrain Conductivity Report	6/30/89
Period 3 PCB Source Assessment Report	9/12/89
Risk Analysis Report (Rev. 2)	11/5/90

The following is a summary of the disposal, storage and spill areas identified as “areas of concern” and environmental findings concerning each area ***prior to remediation***.

A. Landfill and Former Potliner Storage Area (OU1)

The landfill is located in the southwest corner of the facility. The 11.5 acre landfill was in operation from 1957 until June 1990, and during that time received solid waste, industrial waste, construction and demolition debris, spent potlining waste, and PCB contaminated sewage sludge. PCB contaminated capacitors may also be buried in the landfill.

In 1984, work was performed at the landfill which included the installation of a partial leachate collection system, a 350,000 gallon storage tank to collect and hold leachate and surface water, and surface water controls and vegetative cover on portions of the banks on the perimeter of the landfill.

The landfill contains approximately 158,000 cubic yards of waste and approximately 89,000 cubic yards of contaminated soils beneath the waste. Landfill boring analyses have revealed the presence of PAH compounds including anthracene (150 ppm), benzo(a)anthracene (1,000 ppm), benzo(a)pyrene (1,100 ppm), benzo(b)fluoranthene (2,100 ppm), benzo(g,h,i)perylene (430 ppm), benzo(k)fluoranthene (1,000 ppm), chrysene (1,700 ppm), dibenzofuran (15 ppm), fluoranthene (2,200 ppm), pyrene (1,900 ppm), PCBs (0.39 - 690 ppm), fluoride (8500 ppm), phenols (21 ppm), sulfate (13, 000 ppm) and Total cyanide (300 ppm). Metals analysis has shown aluminum (87,000 ppm), arsenic (110 ppm), beryllium (11 ppm), cobalt (23 ppm), iron (330,000 ppm), manganese (4,500 ppm), sodium (59,000 ppm), and vanadium (970'ppm).

The northern portion of the landfill is underlain by approximately 5 to 10 feet of brown glacial till, which is underlain by gray glacial till with an average permeability estimated at 1 x 10E-6. The average groundwater velocities have been estimated at 0.8 feet/year. The southern portion of the site is underlain by a gray clay unit whose thickness varies from a few feet to 20 feet. Gray glacial till is present beneath the clay unit. Groundwater beneath the landfill generally flows to the south to discharge to the wetlands. An upward vertical gradient exists in the shallow groundwater flow system beneath the landfill.

Beryllium (13.7 ppb), cyanide (21,700 ppb), fluoride (220 ppm), iron (87,200 ppb), magnesium (80,300 ppb), manganese (3,090 ppb), PCBs (13.3 ppb), phenols (66 ppb), and sulfate (600 ppm) have been documented in the shallow groundwater in exceedance of New York State Groundwater Quality Standards or Guidance Values.

B. Black Mud Pond (OU2)

The Black Mud Pond (BMP) was constructed in 1973 in an unlined borrow pit on the west side of the plant. Its purpose was to hold settling carbon solids (black mud) produced as a by product of the air emissions control system and cryolite recovery plant. Approximately 6 acres in size, the BMP has an approximate volume of 20 million gallons and an estimated 165,660 cubic yards of black mud which in underlain by approximately 22,090 cubic yards of contaminated soils. The BMP operated from 1973 to June 1990.

Black mud is a residue from the processing of spent potliners (federal waste code K088) for-cryolite recovery. Black mud waste is primarily composed of alumina (30-40%) and carbon (35- 45%) with fluoride at 2-5%, cyanide at 61 ppm, and PCBs generally below 8 ppm. Other constituents making up the remaining 15% of the total waste mass of the material include aluminum, calcium, iron, magnesium, sodium, sulfate, PAHs, other metals, and other inorganics. A waste characterization of the black mud liquor has shown elevated levels of aluminum, arsenic, sodium, and vanadium. The liquor also contains detectable levels of barium, calcium, copper, lead, nickel, potassium, and zinc. PCBs have also been found in the liquor up to levels of 2.8 ppb. PAH compounds include benzo(b)fluoranthene, chrysene, fluoranthene, and pyrene.

The Black Mud Pond is situated on a ridge in the western portion of the plant. In general, the ridge is composed of gray glacial till. However, in some areas adjacent to the Pond, additional geologic units are present above the till. In these areas, the gray till is generally overlain, from top to bottom, by several feet of fill material, a few feet of sandy winnowed till and a few feet of brown glacial till. The till unit has an average permeability estimated at 1 x 10E-6 cm/sec. The groundwater velocities in this till unit have been estimated to be on the average of 3 feet/year. The gray till is underlain by dolomite bedrock which is thought to be present at a depth of approximately 100 feet.

Depth to groundwater in the vicinity of the Pond generally varies from a few feet to 15 feet. A surface water divide between the St. Lawrence River and the Raquette River crosses the ridge on which the Pond is located. Based on available data, flow in the shallow groundwater flow system is radial in nature. Due to the Pond's location on the ridge, a downward vertical gradient exists in the groundwater flow system underlying the area.

The Black Mud Pond groundwater data has shown cyanide, fluoride, iron, magnesium, manganese, PCBS, phenols, and sulfate in exceedance of New York State Groundwater Quality Standards or Guidance Values.

C. <u>North Yard (OU3)</u>

The North Yard area is the location of the Heat Transfer Medium (HTM) system which is used to maintain the temperature and fluidity of the coal tar pitch for anode and cathode manufacturing. Historically the HTM was an oil containing PCBs and through leaks and spills over the life of the system, high levels of PCBs had accumulated in the soils of the North Yard. The HTM system was retrofitted with non-PCB oils in the early 1980's.

Approximately 400 soil samples have been collected in the North Yard to define the horizontal extent of PCB, polychlorinated dibenzofurans (PCDF) and dibenzo-p-dioxins (PCDD) contamination. In addition, 27 soil samples were taken to define the vertical extent of PCB contamination. Soils are contaminated with PCBs at levels up to 89,000 ppm. Dioxin and dibenzofurans have also been shown to exist in the North yard at levels of 9.92 ppb and 9.35 ppb, respectively.

All raw materials needed for the operation of the reduction plant and the shipment of finished products enter and leave through the North Yard area. In addition to the HTM system and the Pitch Pump House being located in the North Yard, other plant facilities in the area include: the Unloading Shed for receiving alumina, coke, soda ash and fluoride, Pitch Storage Tanks and the Truck Unloading Dock. Any remedial action within the North Yard area will need to consider impacts to the every day operations. North of the Pitch Pump House, the North Yard area is immediately underlain by approximately 2 to 4 feet of fill (reworked till). The fill material is underlain by several feet of brown till, which overlies the gray till unit. South of the Pitch Pump House, the North Yard area was built in "cut" into the glacial till and no extra fill material was needed.

Depth to groundwater in the area varies from approximately 2 to 15 feet. North of the Pitch Pump House, shallow groundwater flows to the north to discharge to the St. Lawrence River. Shallow groundwater flow conditions south of the Pitch Pump House are much more complex due to the existence of backfilled utility trenches and french drains in this area. Based on measured groundwater levels, it is clear that groundwater flow conditions in this area are affected by the presence of these structures. However, the extent to which the trenches and drains influence groundwater flow is not known at this time. Average groundwater velocities in the North Yard utility trenches have been estimated at 2900 feet/year. Average permeability of the fill material in the North Yard has been found to be approximately 1.4 x lOE-1 cm/sec. The underlying till average permeability has been found to be approximately 5 x 10E-4 cm/sec.

Shallow groundwater in the North Yard has been shown to contain arsenic (140 ppb), cyanide (3.920 ppm), fluoride (56.3 ppb), iron (27. 700 ppm), magnesium (157,000 ppm), manganese (1.060 ppm), phenols (5.4 ppb), and sulfate 2,140 ppm). PCBs have also been detected at levels in exceedance of New York State Groundwater Standards or Guidance Values.

D. <u>Wetlands (OU4)</u>

The wetlands area of concern is located south and east of the landfill area. Prior to construction of the 1984 controls at the landfill (described above), groundwater and surface water discharged directly to the wetlands from the landfill. In addition, sediments contaminated with high concentrations of PCBs from the Rectifier Yard migrated into the wetlands. As a result, approximately 10 acres of wetlands immediately south of the landfill have been impacted by surface water, groundwater and sediment contamination, as well as other areas of the wetlands downstream of the landfill and east of the landfill, south of the Rectifier Yard Ditch.

The Wetlands sediments have elevated levels of aluminum, arsenic, iron, magnesium, sodium, vanadium, cyanide, fluoride, sulfate and phenols in relation to background. PCBs at levels up to 19 ppm have also been documented. In the Final Remedial Investigation Report, it was estimated that approximately 7,520 cubic yards of sediments in the Wetlands contain PCB contamination at concentrations of 1.0 ppm or greater. After further evaluation of the extent of contaminated sediments, a revised estimate was presented in the Revised Final Feasibility Study (FS). It is now estimated that 5,153 cubic yards of contaminated sediments are located in the Wetlands drainageways and that 11,132 cubic yards of contaminated sediments are located in the open water area of the "impacted" portion of the Wetlands. Therefore, the total estimated volume of sediments in the Wetlands containing PCBs at 1.0 ppm or greater is now estimated at 16,295 cubic yards.

The "impacted" portion of the Wetlands is defined in the FS as a 10.1 acre area immediately adjacent to the south side of the Landfill/Former Potliner Storage Area. However, additional PCB sampling in the Wetlands performed by the NYSDEC in 1988 has shown that the PCB contamination extends south to the NYS Route 37 median where concentrations as high as 14.1 ppm PCBs were documented. This additional area was not addressed in the FS. The Raquette River sediment was also sampled under provisions of a USEPA Order on Consent and no PCBs were detected.

The Wetlands surface water samples have shown levels of PCBs (2-6 ppb), chrysene(19 ppb), fluoride (54 ppm) and bis(2-ethylhexyl)phthalate (17 ppb) above background.

Subsurface geologic conditions beneath the Wetlands are similar to those beneath the southern portion of the Landfill and Former Potliner storage area which exhibits an average permeability estimated at 1 x 10E-6 and average groundwater velocities of an estimated 0.8 feet/year, except in the thicker clay unit located beneath the Wetlands which should exhibit lower permeability.

The Wetlands is a groundwater discharge area for the southern portion of the RMC facility and therefore contaminants are not likely to leave the area via the groundwater. Drainage from the Wetlands flows south via two intermittent streams, through drainage culverts under NYS Highway Route 37, into the Raquette River.

E. Potliner Pad (OU5)

The Potliner Pad is a concrete surface structure located adjacent to the crusher building on the northwest side of the plant. Historically the potliner pad was used to store spent potliner materials (K088 waste).

Sediment sample results, from samples collected from the drainage pathway located west and north of the Pad, have shown elevated levels of aluminum (72,000 ppm), arsenic (46 ppm), beryllium (11 ppm), cobalt (10 ppm), cyanide (30 ppm), fluoride (2700 ppm), PCBs (6.6 ppm), sodium (24,000 ppm), sulfate (350 ppm), and vanadium (66 ppm) in comparison to background. It is estimated that there is approximately 295 cubic yards of sediment contaminated with low level PCBS (concentrations between 1 ppm and 10 ppm) and approximately 3,141 cubic yards of contaminated soils within the Potliner Pad vicinity.

The Potliner Pad is underlain by fill material (reworked till) whose thickness generally increases to the north. The fill thickness in the immediate site vicinity varies from approximately 2 to 5 feet. The fill is underlain by a brown till which overlies gray glacial till.

Depth to groundwater in this area is approximately 5 to 10 feet. Groundwater in the vicinity of the site flows to the northeast toward the St. Lawrence River. As with the other areas of concern, the permeability of the deeper brown and gray till is much less relative to the shallow fill. A backfilled drainageway which extends from the site area to the St. Lawrence River, may behave as a preferential migration pathway for contaminated groundwater.

Shallow groundwater in the Potliner Pad area has shown levels of arsenic (38 ppb), beryllium (25.3 ppb), cyanide (52,600 ppb), fluoride (374 ppm), iron 278,000), magnesium (275,000 ppb), manganese (197 ppb), PCBs (0.10 ppb), phenols (0.19 ppb), and sulfate (1690 ppm) in exceedance of New York State Groundwater Quality Standards and Guidance Values.

F. Miscellaneous Areas (OU6)

The areas of concern identified as the Miscellaneous Areas include the following sites around the RMC facility: Rectifier Yard, Soil Stock Pile, West Ditch Outfall, 002 Diversion Area, North of Haverstock Road, and 004 Outfall. These areas of PCB contamination are relatively small and localized, and brief descriptions are presented below.

Rectifier Yard - The rectifier yard is located adjacent to the south side of the plant. The area consists of step-down transformers, rectifiers and power lines. Surface water is drained from the rectifier yard by a network of catch basins that discharge to the south into the wetlands. Soils in the rectifier yard are contaminated with PCBs between 2.2 ppm to 7.1 ppm. Surface sediment samples found in the drainageway south of the rectifier yard showed levels of PCBs up to 2300 ppm and up to 3200 ppm at a depth of 1 foot below the ground surface. There is approximately 4,330 cubic yards of contaminated sediments with levels of PCBS greater than 1 ppm. It is assumed that the subsurface geologic conditions are similar to those present beneath the Landfill and Former Potliner Storage Area. Groundwater in this area is believed to flow to the south or southeast to discharge to the wetland.

Soil Stock Pile - The soil stockpile was located southwest of the Black Mud Pond. It consisted of materials which were excavated during the construction activities at the RMC facility. This area of concern contains approximately 2,700 cubic yards of material containing less than 10 ppm PCBS. It is assumed that hydrogeologic conditions are similar to those described for the Black Mud Pond.

West Ditch Outfall - A portion of the west ditch, between Haverstock Road and the Potliner Pad had been previously remediated by excavating PCB contaminated soils. However the downstream outfall portion of the ditch, north of Haverstock Road, had not been addressed. It is this area that was considered a Miscellaneous Area. A portion of the West Ditch, between Haverstock Road and the Potliner Pad, was previously remediated by excavation of soils contaminated with PCBS. However, the downstream outfall portion of the ditch, north of Haverstock Road, was not addressed during the IRM work. It is this outfall section of the West Ditch that is being considered as a Miscellaneous Area. Past sediment sampling along the shoreline of the St. Lawrence River adjacent to this outfall had shown low levels of PCB contamination (less than 10 ppm).

Area North of Haverstock Road - This area is directly north of the fuel oil containment areas of the North Yard. It is believed that PCB contamination of the area north of Haverstock Road resulted from contaminated soils being transported across the road by storm water runoff and snow melt, from the north slope of the fuel oil containment berms of the North Yard. It is believed that the PCB contamination in the area north of Haverstock Road resulted from contaminated soils, transported across the road by rain water runoff and snow melt, from the north slope of the fuel oil containment areas of the North Yard. Previous sampling in this area indicated PCB contamination levels in the soils ranged from 4.2 ppm to 1,800 ppm (at a depth of 2 feet).

Outfall 004 - The outfall ditch portion of the SPDES permitted 004 outfall system is located north of Haverstock Road and east of the North Yard. In the past the outfall discharge runoff from the fuel oil containment areas in the North Yard. Additional sampling in the previously remediated 004 outfall ditch (March 1991) revealed elevated PCB levels in the ditch sediments (up to 1.48 ppm) that require action. It is believed that the PCB contaminated sediments originated from the same area as the PCB contaminated soils located north of Haverstock Road.

002 Diversion Area - In the past, surface water flow in the vicinity of sewage treatment plant flowed eastward along a creek bed south of the railroad tracks, crossing underneath the tracks and Haverstock Road then discharging into the St. Lawrence River. Interim Remedial Measure construction in 1989 diverted this direct point discharge into a retention basin located northeast of the East Cast House. It is in this area near the retention pond that additional PCB contamination was found. As part of the 002 diversion project completed in 1989, soil was excavated in the vicinity of the retention basin to enable the installation of the Outfall 002 drainage pipeline. During the work, confirmatory soil samples were taken to verify PCB levels in the soils to be left in place. PCB contamination was confirmed in two areas where sampling results showed PCB levels of over 10 ppm and over 50 ppm respectively.

3. Has the migration of contaminated groundwater stabilized (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[2] as defined by the monitoring locations designated at the time of this determination)?

__X__ If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the horizontal or vertical dimensions of the "existing area of groundwater contamination").

____ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination") - skip to #8 and enter "NO" status code, after providing an explanation.

____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

In March 1993, the DEC executed a Remedial Design/Remedial Action (RD/RA) Consent Order (index no. A6-0291-92-12) for the design and construction of the remedial program at the RMC site.

The DEC determined that many of the remedial action objectives identified are best achieved through excavation of contaminated wastes, sediment, and soils. Site-wide remedial action commenced in 1994 and, as of October 1996, remediation at all areas of concern has been completed, with the exception of the landfill (OU1). While a new leachate collection system and long term monitoring wells have been installed, the final landfill cap and leachate collection system monitoring piezometers have not yet been installed. The final cap along with the piezometers will be completed after RMC completes the St. Lawrence River dredging remediation project being implemented under provisions of a USEPA Order on Consent. A description of the remedial actions is summarized below:

A. <u>Landfill and Former Potliner Storage Area (OU1)</u>

A new and upgraded groundwater and leachate recovery system was installed, which was keyed into highly impermeable material below the landfill. All collected leachate and groundwater is being treated at the North Yard water treatment system. Low level contaminated soils from the wetlands, potliner storage pad and the miscellaneous areas were consolidated in the landfill, and a long term groundwater and surface water monitoring program has been implemented. Once the dredging

[2] "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

project is completed (by the end of 2001), a hazardous waste landfill cap will be installed over the entire area to contain the waste in-place and reduce infiltration of precipitation and subsequent leachate generation.

B. <u>Black Mud Pond (OU2)</u>

All wastes within the Black Mud Pond, and the soils beneath contaminated by the wastes, were dewatered and capped in-place. The cap conformed with the requirements for an approved hazardous waste disposal facility. As part of the remedial design, additional borings were drilled through the site to precisely define the thickness of the waste and vertical extent of soil contamination, and monitoring wells were installed in the underlying soils. Groundwater levels are measured monthly to monitor the effectiveness of the capping. If the monitoring data indicate to the Department that the water table has not been lowered below the contaminated soil and waste as a result of the capping, the installation and operation of a perimeter groundwater collection trench system will be required and the collected groundwater will be treated in the North Yard water treatment system. A long term groundwater and surface water monitoring program has been implemented.

C. <u>North Yard (OU3)</u>

The original ROD required soils in the North Yard and other areas of the facility contaminated with PCBs at concentrations of 25 ppm or greater undergo on-site treatment prior to on-site land disposal. Soils in the North Yard contaminated with PCBs at levels of 25 ppm or greater were to be excavated for on-site treatment. Soils remaining that were contaminated with PCBs at levels between 10 ppm but less than 25 ppm were to be capped with a multi-layered asphalt cap. The ROD specified incineration as the chosen treatment technology but allowed RMC to evaluate other technologies including solvent extraction and thermal desorption.

During the period after the Department signed the ROD, disposal fees at secure landfills permitted to accept hazardous waste dropped significantly. As a result, RMC requested that the Department amend the ROD to eliminate on-site treatment, and instead allow for off-site disposal of contaminated soils at concentrations of PCBs of 50 ppm or greater. Excavated soils containing less than 50 ppm PCBs would be consolidated in the on-site industrial landfill and capped in accordance with NYSDEC and United States Environmental Protection Agency (USEPA) requirements for hazardous waste landfills. To support that request, RMC presented to the NYSDEC a document entitled <u>Request for Modification of Record of Decision, Reynolds Metals Company St. Lawrence Reduction Plant, Massena, New York</u> dated January 1995. The Department issued an amendment to the ROD in June 1995.

Included as part of the ROD amendment was a design change relating to the excavation of contaminated soils in the North Yard. The design change allowed RMC to establish a predefined horizontal limit of excavation that minimized disruption of plant operations in this area. Soils within that horizontal limit were excavated to a depth predetermined by existing and additional soil borings and sampling. Further excavation was performed where preferential pathways for vertical contaminant migration were identified.

Changes to the remediation methods minimized disruption to the North Yard operations by reducing the surface area affected by excavation work while not significantly reducing the volume of waste removed. Most of the difference occurred in the southern part of the North Yard where groundwater controls were currently in use and have the most potential to be effective. Impacts to plant operations from excavation work in this area were minimized by establishing a predefined horizontal limit of excavation based on a surface soil PCB concentration of 100 ppm. All soil at depth, contaminated with PCBs at levels 25 ppm or above, were removed as determined by soil borings and sampling. The design change reduced the overall area to be excavated in the southern part of the North Yard by approximately 1.0 acre. The excavation in this area was backfilled with a “flowable fill” (low strength concrete), and capped with a composite cap consisting of a geomembrane, a drainage layer and select stone cover.

In the northern part of the North Yard, where remediation did not impact daily operations, the design change increased the area currently required to be excavated under the ROD by removing all soils contaminated with PCBs at levels of 10 ppm or greater. As a result, the total area of North Yard excavation increased from an estimated 4.6 acres to 4.9 acres.

All other areas where post-remedial PCB contamination in the soil equals or exceeded 10 ppm were capped with a low permeability concrete pavement. Groundwater in the north yard is collected for treatment in the north yard water treatment system, and a long term groundwater and surface water monitoring program has been implemented. Final remediation in the North Yard will be undertaken upon plant closure.

D. <u>Wetlands (OU4)</u>

Remediation included dewatering of the currently identified impacted area of the wetlands and excavating the soils and sediments in that area and adjacent drainage ways. The excavated material was placed in the landfill for management as described under the Landfill Former Potliner Storage Area. Restoration and/or mitigation of the wetlands destroyed or impacted as a result of RMC’s activities was the subject of further study to determine the scope of applicable alternatives. As a result of that study it was determined that a combination of restoration of the impacted areas along with additional wetlands creation in a separate area of the RMC property would be the preferred alternative for remediation of the wetlands. RMC has implemented plans for a wetlands creation site located west of the BMP.

E. <u>Potliner Pad (OU5)</u>

All contaminated soils and sediments at the potliner storage pad and adjacent drainage ditches were excavated to achieve cleanup goals and disposed of in the on-site landfill. Once excavation was complete in the ditches, they were backfilled with crushed stone. The excavated area surrounding the potliner storage pad was backfilled and paved and the pad rehabilitated. A long term groundwater and surface water monitoring program has been implemented.

F. <u>Miscellaneous Areas (OU6)</u>

Remedial action of the miscellaneous areas entailed excavation of soils and sediments with PCB concentrations exceeding the cleanup goals established for these areas. The excavated areas were backfilled, graded and seeded. A long term surface water monitoring program has been implemented.

4. Does “contaminated” groundwater discharge into surface water bodies?

____ If yes - continue after identifying potentially affected surface water bodies.

__X__ If no - skip to #7 (and enter a “YE” status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater “contamination” does not enter surface water bodies.

____ If unknown - skip to #8 and enter “IN” status code.

Rationale and Reference(s):

Based on groundwater monitoring performed to date and the successful installation and operation of the leachate collection system, there is no indication of continued discharge of contaminated groundwater to surface water bodies.

5. Is the discharge of "contaminated" groundwater into surface water likely to be "insignificant" (i.e., the maximum concentration[3] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

____ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of <u>key</u> contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

____ If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration[3] of <u>each</u> contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

____ If unknown - enter "IN" status code in #8.

Rationale and Reference(s): ____

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[3] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

6. Can the discharge of "contaminated" groundwater into surface water be shown to be "currently acceptable" (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

____ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,[5] appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/ habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

____ If no - (the discharge of "contaminated" groundwater can not be shown to be "currently acceptable") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

____ If unknown - skip to 8 and enter "IN" status code.

Rationale and Reference(s): ______________________________

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[4] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[5] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

7. Will groundwater monitoring / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

X If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

____ If no - enter "NO" status code in #8.

____ If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

In accordance with the Operation, Maintenance & Monitoring (OM&M) Plan for the site, sampling of groundwater from monitoring wells on-site and on adjacent properties for VOCs by EPA Method 8260 is performed quarterly. Additional wells are sampled on an annual basis.

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

X YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the Reynolds Metal Co. facility located at Massena NY. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater". This determination will be re-evaluated when the State becomes aware of significant changes at the facility.

____ NO - Unacceptable migration of contaminated groundwater is observed or expected.

____ IN - More information is needed to make a determination.

Completed by ____ Date _______________
Eric Hausamann
Environmental Engineer 2

Supervisor ____ Date _______________
James Harrington
Bureau of Program Management
Division of Environmental Remediation

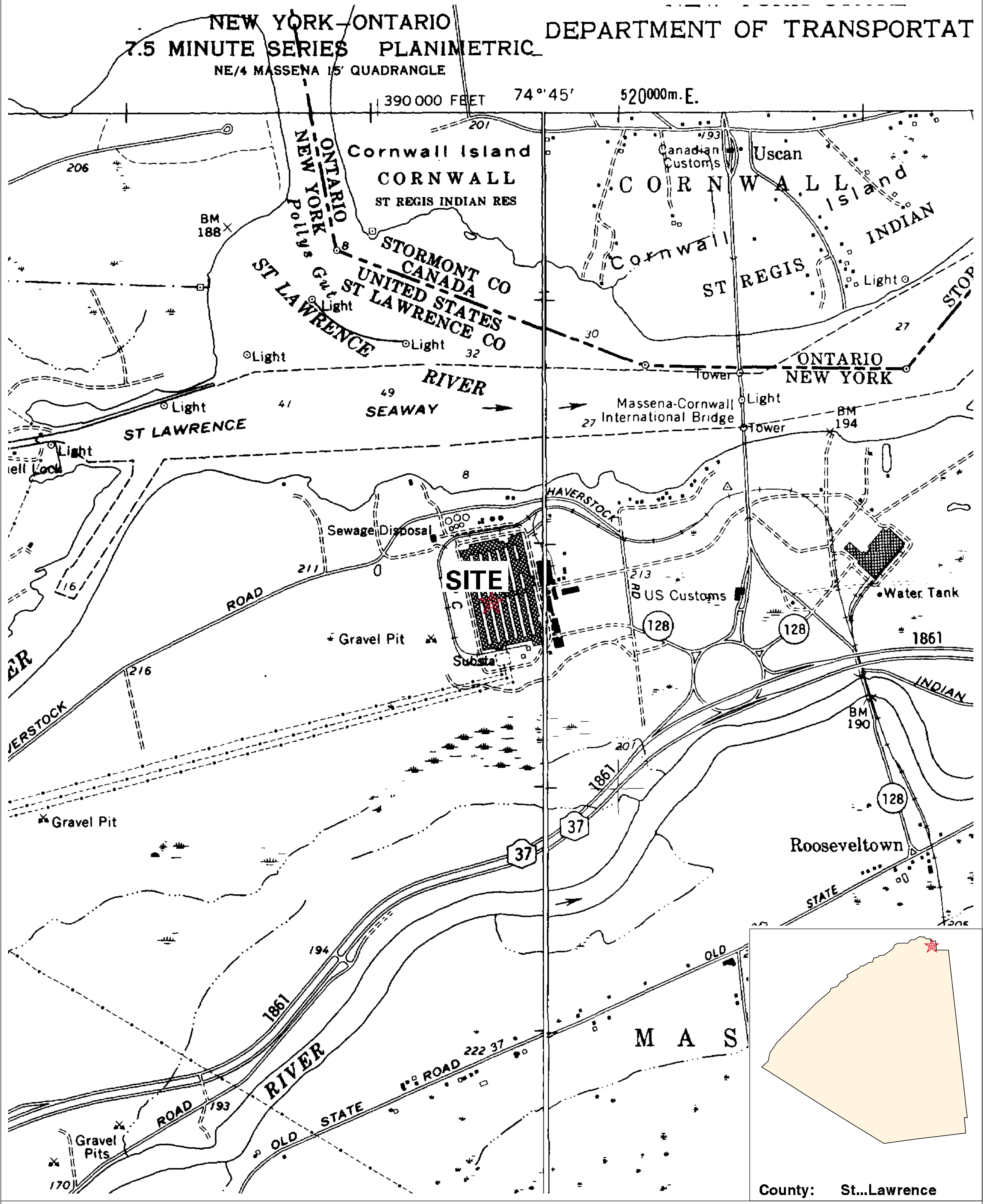
Director ____ Date _______________
Paul J. Merges, Ph.D.
Bureau of Radiation and Hazardous Site Management
Division of Solid and Hazardous Materials

Locations where References may be found:

New York State Department of Environmental Conservation
Region 6
State Office Building
317 Washington St.
Watertown, NY 13601

Contact telephone and e-mail numbers

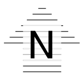
Darrell Sweredoski
(315) 785-2513
dmswered@gw.dec.state.ny.us



Site Location Map

645009 Reynolds Metals Company

NYSDOT Planimetric Quadrangle(s):
HOGANSBURG, RAQUETTE RIVER



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